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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/797,188

03/11/2004

Taiji Ema

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01/07/2009

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EXAMINER

DAHIMENE, MAHMOUD

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

01/07/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/797,188

Applicant(s)

EMA ET AL.

Examiner

MAHMOUD DAHIMENE

Art Unit

1792

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,3,5,19 and 23-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,3,5,19 and 23-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/01/2008 has been entered.

Allowable Subject Matter Withdrawn

Regarding claims 2, 5, 24-27, after further consideration, allowable subject matter is withdrawn because it appears that the reference of Dennison reads on all the limitations of applicant's claim 2.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession

of the claimed invention. It appears that there is not support for the new limitation of " in the step of forming the fourth insulation film, the fourth insulation film is formed over a side wall of the conductor pattern; and in the third step of etching the first insulation film, the first insulation film is etched to form the opening, exposing in a part of a bottom thereof a second region of the semiconductor substrate, which is other than the first region, and exposing in another part of the bottom thereof the fourth insulation film. ". The examiner could not find, in applicant's specification, a section or a figure that reasonably conveys such limitations.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear how in the third step of etching the first insulation film, the first insulation film is etched to form the opening, exposing in a part of a bottom thereof a second region of the semiconductor substrate, which is other than the first region, and exposing in another part of the bottom thereof the fourth insulation film. It is not clear if the fourth insulation film is formed only on the conductive pattern (see applicant's claim 2) or over the whole substrate.
6. Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention. it is not clear what "an etching rate of the second insulation film **at the** first step of etching the third insulation film" is, since the second and the third insulating films are etched with two separate etching steps according to claim 2.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 2, 3, 5, 19, 23-27, are rejected under 35 U.S.C. 102(e) as being anticipated by Dennison et al. (US 5,338,700).

Regarding claims 2, 19, 23-27, Dennison discloses a method for forming a bit line over capacitor array of memory cells, the method comprises:

forming a conductor pattern (12), (14), (16), (26) over a semiconductor substrate (figures 3-4), active region 26 defines a first active region for electrical connection (conductive) with a memory cell capacitor;

forming a first BPSG insulation film (28) covering the conductor pattern and having a substantially fiat surface (30);

forming over the first insulation film a second insulation film (50) (Oxide + nitride) having etching characteristics different from those of the first insulation film citing "Such would typically be conducted by photomasking and dry chemical etching of BPSG selective to nitride. An example etch chemistry would include CHF.sub.3 and O.sub.2 at low O.sub.2 flow rate (i.e., less than 5% O.sub.2 by volume in a CHF.sub.3 /O.sub.2 mixture), or the combination of CF.sub.4, AR, CH.sub.2 F.sub.2 and CHF.sub.3.

Thereafter, a blanket etch of the wafer is conducted to etch nitride layer 20 selectively to silicon to upwardly expose active area 24. An example etch chemistry would include a combination of CHF.sub.3 and CF.sub.4. The principle purpose of barrier layer 20 is to prevent diffusion of boron or phosphorous atoms from BPSG layer 28 into active areas 24 and 26. Caps 18 are preferably comprised of nitride (Si.sub.3 N.sub.4) where layer 28 is comprised of oxide, such that the contact etch to produce first contacts 32 will stop relative to word lines spacers and caps 18." (column 3, line 60) ;

forming over the second insulation film a third insulation film (52) (BPSG) having etching characteristics different from those of the second insulation film (50);

forming over the third insulation film a mask layer (Dennison broadly discloses etching of openings typically is conducted by photomasking and dry chemical etching of BPSG selective to nitride (column 3, line 63) which is applicable here as well); and forming a hole in the third insulation film, the second insulation film and the first insulation film, the step of forming the hole including a first step of etching the third insulation film, a second step of etching the second insulation film and a third step of etching the first insulation film, an etching condition at the first step being different from that at the second step since Dennison uses a different etching chemistry to etch each type of layer, and further comprising:

before the step of forming the first insulation film(28), the step of forming over the conductor pattern a fourth insulation film (20) (nitride) having etching characteristics different from those of the first BPSG insulation film, and wherein in the step of forming the first insulation film, the first insulation film is formed over the fourth insulation film so as to cover the conductor pattern, and in the third step of etching the first insulation film, the first insulation film is etched with the fourth insulation film as a stopper, Dennison clearly suggests etch selectivity between BPSG and silicon nitride (column 3, line 60) which means when the BPSG (28) is etched, a new etch step needs to be initiated in order to remove the nitride (20), therefor nitride (20) acts as an etch stop layer for the BPSG (28) etch step. It is noted that Dennison does not expressly call (20) an etch stop layer, however, according to Dennison's description, the examiner interprets layer (20) to be an etch stop layer since the BPSG (28) etch step is stopped before etching layer (20).

As to claim 3, 5, the sidewalls of ((14) and (16) are covered by (20) and (28) (figure 4) and the etching is performed over regions (16) and (26) which reads on the limitations of applicant's claim 3.

Response to Arguments

9. Applicant's arguments, filed 12/01/2008, with respect to the rejection(s) of the claim(s) under 35 USC § 112 have been fully considered and are persuasive in view of the amendments. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Dennison et al. (US 5,338,700) because it appears that the reference of Dennison reads on all the limitations of applicant's claim 2. Since applicant's claim language refers to a multitude of layers and multitude of etch steps, and since 60 figures are presented in the specification, the examiner respectfully suggests to the applicant to refer specifically to one of the 60 figures in applicant's specification, in the arguments/remarks section of the response to the present office action, to clarify the 35 USC § 112 first paragraph remaining issues.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAHMOUD DAHIMENE whose telephone number is (571)272-2410. The examiner can normally be reached on week days from 8:00 AM. to 5:00 PM..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. D./
Examiner, Art Unit 1792

/Nadine G Norton/
Supervisory Patent Examiner, Art Unit 1792